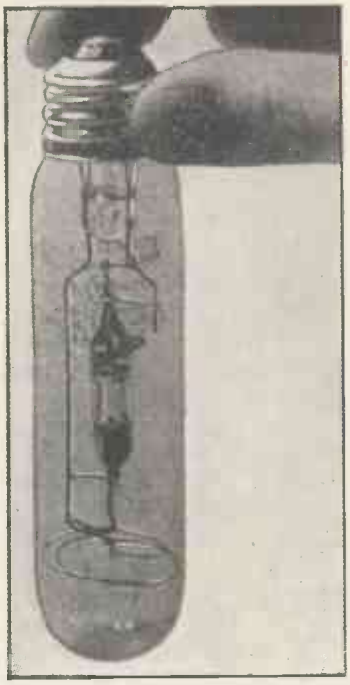
# A NEW LIGHT SOURCE FOR TELEVISION

## BY DR. LEE DE FOREST

*We are indebted to "Radio Craft" (U.S.A.) for the following information on the development of a new and very intense light source which it is expected will be suitable for television purposes.*



*The new Westinghouse mercury-vapour lamp which produces the most intense artificial light so far developed.*

THERE are two classes of light source suitable for mechanical systems of television, one where the light source itself is modulated at television frequencies and the other where the light source is of fixed intensity and modulated by a Kerr cell or other practical inertialess light valve. From the first division, the arc lamp may be excluded on account of its inconstancy. High-intensity tungsten point lights of the incandescent-filament type may be developed, but because of the extreme brilliancy at which it is necessary to burn such filaments their life is apt to be far too brief to meet the requirements of home television.

Most promising in its division now appears to be the high-intensity, high-pressure quartz capillary mercury vapour lamp on which Philips Company of Holland has been at work for some years. In this country (America) the General Electric and Westinghouse Co.s are each developing this type of high-pressure mercury vapour lamp with every promise that this source shortly will be available for television purposes.

### *The Light that Rivals the Sun!*

In the air-cooled variety the intensity of the capillary vapour stream is approximately that of the electric arc crater or 85,000 candle-power per sq. in. But where the capillary is water-cooled by being encased in an outer glass tube through which a rapid stream of cold water is maintained flowing, high mercury pressures (20 atmospheres) are obtained; and a light intensity value *equal to that of the sun's disc*, or some 250,000 candle-power per sq. in.!

The lamp illustrated measures about $5\frac{5}{8}$ ins. × $1\frac{1}{4}$ ins. overall, the actual light element being only $1\frac{1}{2}$ ins. × $\frac{1}{2}$ in. in diameter. It is operated from a transformer which delivers 250 volts at the secondary, and the mercury arc is approximately $\frac{1}{2}$ in. long, a striking contrast with the usual mercury-vapour lamps in which the arc is of varying lengths from 5 ins. up. Thus the ideal "point source" is approached more closely than ever before in this type, which makes its use in television of the greatest interest. As with other lamps of the mercury-vapour type, the starting time is 3 to 4 minutes, before full brilliance is attained.

### *Modulation*

Whereas a water-cooled device of this nature would scarcely be practical in a home, the less brilliant, air-cooled high-pressure mercury-vapour source appears to give sufficient brilliancy even after the light passes through (Nicol prisms, or equivalent) and a Kerr cell, and necessary lenses, etc., to illuminate with acceptable brilliancy a screen area of at least 4 sq. ft.

While the most obvious use of this new mercury vapour lamp would be as a fixed source with light valve modulation, it is not at all uncertain that the brilliancy of this source cannot be directly modulated at television frequencies. If so, this latter arrangement will afford many advantages over the fixed source with Kerr cell and polarising devices.

## Electrical Interference with Broadcasting.

A committee appointed by the Institute of Electrical Engineers have come to the conclusion that, given the power the Post Office can eliminate all interference to radio providing it is of the locally generated type.

On the average over 40,000 complaints are dealt with each year from listeners who have suffered interference caused by lifts in buildings, trolley buses and trams, domestic appliances of all kinds, neon display signs, and medical apparatus. All these different sources of interference have been dealt with by the addition of condenser-choke filters of a simple kind. The biggest difficulty has been obtaining the permission from the owners of the apparatus and deciding who shall pay for the filters.

If legislation were introduced to line up with other countries the Post Office would be able to eliminate, within a year or so, most of the interference to radio and television.

Manufacturers would be compelled to fit suppressors to all equipment likely to cause interference for the cost of these suppressors, when bought in quantities, is only a shilling or so, which would not affect the price of the apparatus.

Listeners who complain of crackling spoiling the radio programmes do not realise that it may come from the traffic sign at the street corner or from the local barber who has invested in a new hair dryer.

It is the intention of the committee to approach the Government with a view to granting the power to the Post Office so that in the near future radio interference from such equipments can be dealt with legally.

## Aircraft and Television.

Television may soon play a part in landing aircraft during fogs by supplying the pilot with a picture of the landing ground and the exact position of the plane. Direction finders at the aerodrome log the position of the plane which is passed on to a television transmitter. This picture is passed on to the plane while a lamp lights up behind a plan of the ground mounted on the plane. By means of these two checks the pilot can tell his exact position and also the best direction in which to land.